passageway of precise uniform inner diameter while passageways 64 and 68 extend in an axial direction only partially through the valve element 14 from 14' of said element. The radial bores 72 and 74 are provided in element 14 entering from the outer circumferential surface 76 thereof and communicating to the inner end 64' and 68' of the partial passageways 64 and 68. The inner diameter of bores 72 and 74 is sufficient to enable seating therein of nipples 78 and 80, one of which is capable of being coupled to a conduit 82 leading to the preselected delivery location for receiving the larger volume of sample which comprises the interior volume of the hollow loop 38 and the other (80) enabling coupling thereto of a conduit 82 leading from a source S_2 of diluent for directing the predetermined volume of diluent to the hollow loop 38 when the valve element 14 is rotated to place the valve 10 in its delivery condition from its load condition. Passageway 70 serves only as a communication channel to the pump, holding its content when rotated for delivery of the measured content of loop 38 and passageways 30,32.

When the valve element 14 is rotated from its load condition fo the delivery condition, the through segmenting passageway 66 which defines the smaller measuring chamber is brought into communication with the passageways 34,50 enabling a predetermined volume of diluent from source S_1 to be introduced via passageway 34 to drive the content of the segmenting passageway 66 to the predetermined location via passageway 50 of valve element 16. Also, when the valve is in the delivery condition, the hollow loop 38 is aligned with passageways 64,68 enabling a predetermined volume of diluent to be directed through the hollow loop 38 and deliver the contents of the loop to a predetermined location.

The disc 12 is provided with a through passageway 73 which will couple with bore 72 in number 14, leading out of valve 10. Also, the disc 14 has a through passage 69 which, in the backwash condition of the valve, will connect with passageways 34 and 50 in the front and rear disc members 12, 16 respectively. Hence in the backwash configuration, rinse fluid can be applied from the left side of FIG. 1 into the passageway 73 (as well as into the said passageway 34), which leads into the passageways 69 and bore 72, then out of the valve 10 at selected locations.

The valve 10 returns to the original aspiration condition but fulfills the backwash mode of operation. The disc 14 has been rotated after the delivery has been completed, to place passageway 73 in communication with the passageway defined by bores 68, 72 of disc 14. In this condition, the passageway defined by bores 64,74 is placed out of communication with passageway 30. The sample in passageway 66 has been delivered with passageway 66 being returned to communicate to the passageway 58 leading to the probe 60. Passageway 69 is returned to communicate with passageways 34 and 50. Passageway 70, with its isolated content, is returned to communication with passageways 48 and 30. The rinse liquid is directed from a source through the aligned passageways of the valve 10 to predetermined locations. Passageways 34, 50 provide means of rinsing passageway 69 in the backwash or rinse mode. Passageway 73 is provided to permit rinse or backwash of the passageway defined by bores 68, 72 in element 14.

Attention now is directed to FIGS. 2 and 2A, as well as FIGS. 3A and 3B wherein there is illustrated, as formed in the faces 12' and 16' of the valve elements 12 and 16 respectively, the continuous cleaning channels 100 and 102 which are similar in configuration. Channel 100 is formed in the face 12' and consists of a first or outer groove 104 beginning at passage 106 and extending in a clockwise direction to a location 108 approximately 245° of rotation from its point of origin. The 245° extension of the channel 100 is placed precisely on face 12' so that no portion of channel 100 is exposed regardless of the angular position of member 14. The second or inner groove 110 follows a path concentric to the center of the face 12' and to the outer groove 104. The groove 110 extends counterclockwise along a path toward passage or bore 112. The grooves 104 and 110 are formed along the greater portions of a pair of concentric circles and spaced radially apart a distance of 0.04 radians along a line taken from the center of the face 12'. Bridging or connecting channel or groove 114 completes the continuous channel 100 connecting the inner and outer portions thereof. The opposite sides of both channels 100 and 102 are chamfered at about 45°.An axial bore 112 is formed in the disc 12 and opens to larger diameter coaxial passage 116. Bore 112 is located at the terminus of the inner portions of continuous channel 100. The axial bore 106 is located at the beginning of the outer portion of the continuous channel 100. The center of axial bore 112 is offset from the center of the channel portion 100. Channel 102 is identical to channel 100 and is illustrated in FIG. 3B.

The continuous cleaning channel 102 formed in face 16' of member 16 is substantially identical to the configuration of channel 100. Channel 102 is formed of outer channel 104' and inner channel 110' originating from bore 106' and terminating at bore 112' and joined by arcuate groove 114'. The channels 104', 110' and 114' are chamfered along their sides in the same manner as continuous cleaning channel 100.

In the embodiment illustrated herein, the entry of rinse fluid, generally occuring as a part of the backwash cycle, is effected via passage 118, bore 106 entering the outer portion 104 of the continuous channel 100 and exiting at the passage 116. The chamfered walls of the continuous channel 100 affords smooth flow of rinsing liquids through said channel, washing free any material which may have been collected on said walls or within the channel.

The continuous cleaning channels 100, 102 isolate the junctions of the respective segmenting passageways 66, 68, 69 and 70 from the periphery of the respective faces 12' and 16' which frictionally engage faces 14' and 14'' of the central rotatable member 14. Continuous cleaning channel 100 of like configuration and path also may be provided in respective opposite faces of the center valve element 14 if desired. The rinsing step of the valve operation may be effected at the same time as the backwash operation cycle of the liquid transfer system.

It should be understood that the invention contemplates the provision of the continuous cleaning channel of the invention in other than a valve where the measuring passageways are in other than series connection; in a valve where more than one pair of volumes or measuring chambers are provided and it is not required to be limited to measurement of identical volumes of samples or identical volumes of diluent.

What we claim:

1. In a liquid diluting and transfer valve assembly of the type which includes at least a pair of valve elements, each being frictionally movable one relative to the other and having faces slidably engaged for such frictional